REVIEWS.

ART. XIV.—*A Manual of Practical Hygiene. Prepared especially for Use in the Medical Service of the Army.* By EDMUND A. PARKES, M. D., F. R. S., Professor of Military Hygiene in the Army Medical School; Member of the Medical Council of General Education; Examiner in Medicine in the University of London; Emeritus Professor of Clinical Medicine in University College, London. London: 1864. 8vo. pp. 612.

Practical Observations on the Hygiene of the Army in India: Including Remarks on the Ventilation and Conservancy of Indian Prisons; with a Chapter on Prison Management. By STEWART CLARK, M. R. C. S. Eng., Inspector-General of Prisons, Northwest Provinces, India. Illustrated with Wood-cuts. London: 1864. 8vo. pp. 162.

Lectures on Public Health, delivered in the Royal College of Surgeons in Ireland. By E. D. MAPOTHER, M. D., Professor of Hygiene and Medical Officer of Health, and Surgeon in St. Vincent's Hospital, Dublin. London: 1864. Fcap. 8vo. pp. 280.

Report of the Proceedings of the National Association for the Promotion of Social Science, at the Seventh Annual Congress, held in Edinburgh, October, 1863. Edinburgh: 1863.

HYGIENE is assuming, now, its proper place among the sciences. More has been written upon it, probably, in the last ten years, than in all the preceding years of the century; and many more readers are attracted to the subject. Under the titles of "Preventive Medicine," "Public Health," and "Hygiene," professorships have been founded in many medical schools on the continent of Europe, and in a few of those of Great Britain. In the great Army Medical School at Netley Hospital there are now combined, under the direction of Dr. Parkes, the most perfect appliances for teaching hygiene hitherto realized.[1] This is as it should be. In this country, where the need is equally great, the subject has as yet received only partial or incidental attention in any course of medical instruction, although in private and public labours it is far from being neglected by our professional men.

The work of Dr. Parkes is one of the most important upon its topic ever published. Its origin is explained by its author as having been due to the requirements of the Army Medical School, established upon the recommendation of a royal commission appointed to inquire into the sanitary condition of the army in England. Its design is to furnish a text-book of hygiene, illustrated by examples drawn from army life, for the students of the Army Medical School.

It is divided into two Books, the first considering somewhat generally the chief subjects of hygiene, the second more particularly the service of the soldier. Holding in view constantly what would be useful to army surgeons, often far from all books, Dr. Parkes has endeavoured to make it

[1] Mapother, *op. cit.*, Introductory Discourse.

a work of reference. In this he has succeeded well, by a research which must have been arduous, and a skill and care in compilation and selection which entitle him to the thanks of those for whom he has laboured. A dozen books might be made of the material which he has here collected and condensed into a moderate volume. But, as a text-book for study or reading, this very abundance of hard facts and tables, with very little discussion and no speculation, diminishes its attractiveness. It is, with great value, too heavy to be popular, as the bar of gold is in comparison with the neat and portable coin.

That Dr. Parkes appreciates the vast extent of his department, is shown by the following language in his Introduction:—

"Taking the word hygiene in the largest sense, it signifies rules for perfect culture of mind and body. It is impossible to dissociate the two. The body is affected by every mental and moral action; the mind is profoundly influenced by bodily conditions. For a perfect system of hygiene we must combine the knowledge of the physician, the schoolmaster, and the priest, and must train the body, the intellect, and the moral soul in a perfect and balanced order. Then, if our knowledge were exact, and our means of application adequate, we should see the human being in his perfect beauty, as Providence perhaps intended him to be; in the harmonious proportions and complete balance of all parts, in which he came out of his Maker's hands, in whose divine image, we are told, he was in the beginning made. But is such a system possible?"

Sketching a plan for a work upon the whole scope of hygiene, personal and public, our author narrows himself down to the basis of army sanitation; which, nevertheless, includes and exemplifies the general principles of hygiene applicable to all men.

Water forms the subject of his first chapter. Medical officers must consider in their reports the following points:—

"1. The quantity of water per head per diem; its sufficiency, or the reverse.
"2. Its quality, including its physical and its microscopical characters, and its chemical composition.
"3. Its collection, storage, and distribution.
"4. The condition of tanks, cisterns, pipes, &c.
"5. In the field the medical officer may be called on to indicate the possible sources of water, to estimate the quantity attainable from any source, and to determine the quality." (p. 2.)

Ample and accurate details are given upon all these particulars, with the methods of examining different waters, microscopically and chemically. It is remarked that at present, owing probably to the impossibility of making complete analyses of waters, the exact connection between impure water and disease does not stand on so precise an experimental basis as might be wished. As observed by Mr. Simon, in one of his philosophical reports upon the health of London, we cannot expect to find the effect of impure water always sudden and violent; its results are indeed often gradual, and may elude ordinary observation, yet be not the less real and appreciable by a close inquiry.

Besides diarrhœa, dysentery and cholera, malarious and typhoid fevers are, by many authorities, as cited by Dr. Parkes, considered to depend sometimes upon contaminated water for their production and extension. In regard to autumnal fevers, it has been a general belief—so says our author—among the inhabitants of marshy countries, that the water could produce them. A number of instances are admitted by Dr. Parkes to sustain this view.

"The case of the Argo, recorded by Boudin, is an extremely strong one. In 1834, 800 soldiers, in good health, embarked in three vessels to pass from Bona in Algiers to Marseilles. They all arrived at Marseilles the same day. In two vessels there were 680 men, without a single sick man. In the third vessel, the Argo, there had been 120 men; 13 died during the short passage (time not given), and of the 107 survivors no less than 98 were disembarked with all forms of paludal fevers, and as Boudin himself saw the men, there was no doubt of the diagnosis. The crew of the Argo had not a single sick man. All the soldiers had been exposed to the same influences of atmosphere before embarkation. The crew and the soldiers of the Argo were exposed to the same atmospheric condition during the voyage; the influence of air seems therefore excluded. There is no notice of the food, but the production of malarious fever from food has never been suggested. The water was, however, different—in the two healthy ships the water was good. The soldiers on board the Argo had been supplied with water from a marsh, which had a disagreeable taste and odour; the crew of the Argo had pure water." (p. 54.)

The belief that typhoid fever can spread by means of water as well as air appears to be quite of modern origin, though some epidemics, such as the "Schleimfieber" of Göttingen, in 1760, were attributed in part to the use of impure water. Walz in 1822, Müller in 1843, Richter in 1848, and Austin Flint in 1852, are quoted as having recorded outbreaks of this fever which appeared to have originated in contamination of drinking-water by fecal matter, sewage, &c. Dr. Flint's case was that of the occurrence of typhoid fever in a perfectly healthy village, after the arrival and death of a stranger at an inn—all those attacked using the water of the inn well. The rapidity with which the disease spread did not seem like the ordinary rather slow propagation of typhoid fever through the air. Dr. Parkes observes that "although the evidence is not perfect, it is extremely probable that the well water of the inn was the main medium of the dissemination." Carpenter of Croydon, Routh, W. Budd, Simon, Schmit, and Wilkinson are further mentioned as having narrated particular cases of similar propagation of typhoid fever. Jenner, Budd, and Simon are referred to as especially competent authorities in favour of the *opinion* that water may be the medium of extending typhoid fever.

We have been somewhat full in the citation of Dr. Parkes's statements upon this topic, as it is one of great practical importance. He adds two questions: first, as typhoid fever undoubtedly spreads also through the air, what is the proportion of cases disseminated by water, as compared with those disseminated by air? This cannot be yet answered with positiveness; Dr. W. Budd thinks that the cases of water propagation are numerically small. Secondly, will decomposing sewage in water produce typhoid fever, or must the evacuations of a typhoid patient pass in? The view that the stools of typhoid are the especial carriers of the poison was first explicitly stated by Canstatt, and has been ably argued by W. Budd. In the section "On the Prevention of Diseases in the Army," in a later part of his book, Dr. Parkes thus speaks (p. 437) of the causation of typhoid fever: "A poison of animal origin; one mode of propagation is by the intestinal discharges of persons sick of the disease; other modes of origin and transmission are not disproved. The mode of entrance is by air and water." A peculiar condition of the body is nevertheless considered to be as essential as in smallpox, a first attack preserving in great measure from a second.

These views are gaining ground in England, although they are still not universal. Dr. Jenner holds typhoid fever to be contagious, although infinitely less so than typhus. Dr. Watson doubts the origin of continued fever in any case without contagion. Dr. Murchison has identified his

name with the theory that while typhus is caused by overcrowding, with deficient ventilation and destitution, typhoid fever is produced by emanations from decaying organic matter, or by organic impurities in water, or by both combined.

In Edinburgh, where typhus is the rule and typhoid the exception, dissent has been expressed. In regard to the latter, Dr. Bennett says:[1] "The contagious nature of this form of fever is still doubtful." He asserts that the history of the remarkable epidemic of 1846–7 did not, under his observation, support Dr. Jenner's theory. Dr. Christison, in his able address on public health before the congress of the Social Science Association (Report, p. 109), uses this language in regard to enteric fever:—

"Of all forms of fever, none has been more confidently ascribed than this, by London writers, medical and non-medical, to faulty drainage and faulty provision of water-closets. If we are to believe what some have advanced on the subject, there is no case which may not be traced to foul air, derived mainly from one of these sources. Were this a well-established principle in social science, the extinction of so deadly a fever should be no very difficult matter. But I am sorry I cannot call on you to assent to this theory, and carry out its consequences, for there are insurmountable facts in its way. During the period that this scourge has been increasing in London, has London become less drained, or the habits of its working classes less cleanly? Does the disease generally appear where drainage is bad, or water-closets wanting or faultily constructed? Does it attack workmen who live in the London drains, as well as those over them, near them, or far from them? I believe all these queries must be answered in the negative. And what is the case here? This fever does not by any means generally break out where the streets are ill drained, water-closets wanting, and habits filthy. In countless places of that sort in Edinburgh it is unknown; while I have known a number of deaths from it among people of easy circumstances, not at all so exposed. I suspect, then, that it must be allowed of this disease, as in respect to most other epidemic diseases, that we do not yet know its cause; that foul air merely favors its invasion, but that its true cause is something much more specific, which has hitherto eluded our search."

Fearing to occupy too much space with this topic, we may merely recall, in another quarter, the absolute denial by Andral of the contagiousness of typhoid fever; and the language of Chomel, in 1834, that, besides himself, not one medical man in a hundred in Paris believed in its propagation by contagion. On the other hand, Bretonneau, Leuret, and Gendron[2] have argued strenuously to prove this mode of its extension. In this country, besides Dr. Flint, Nathan Smith in 1824, and Samuel Jackson, of Northumberland, in 1845,[3] adduced instances in support of the same conclusion. This is, however, certainly not the general opinion of practitioners in this country. We find nowhere a view of the subject so sound, in accordance with the preponderance of the facts observed on this side of the Atlantic, as that of Dr. Wood:—[4]

"It not unfrequently originates in the pure air of the country. I have met with it in the healthiest regions of our Middle States, even among the mountains. It is constantly springing up in isolated cases, without any possible communication. If contagious at all, it must be so only feebly, and under peculiar circumstances. On the whole, the most rational view of the etiology of enteric fever seems to be, that an inherent predisposition to this disease exists in many persons, analogous, in some measure, to the tuberculous, the gouty, and the rheumatic predisposition, which is liable to be called into action

[1] Clinical Medicine, p. 910.
[2] Bartlett on Fevers, p. 102.
[3] Am. Journ. of Med. Sciences, Oct. 1845.
[4] Practice of Medicine, vol. i. pp. 327–8.

by various exciting causes, perhaps by almost any cause capable of considerably disturbing the vital functions. Hence its occurrence after fatigue, anxiety, &c. The effluvia of animal excretions, the contagious miasm of typhus, and even marsh miasmata, may act as exciting causes in the predisposed."

Before dismissing the subject of impure water, brief reference may be made to the full adoption by Dr. Parkes of the doctrine that goitre is produced by the use of drinking water containing a marked excess of lime and magnesia. (p. 61.)

Air, its impurities, disinfection, and ventilation are elaborately considered in three chapters of Dr. Parkes' book. Among the modes of purifying an infected local atmosphere, heat is mentioned (p. 78), but hardly enough importance is given to it. Credit is due to Dr. E. Harris,[1] of New York, for his able advocacy of disinfection by heat as one of the most efficacious of all sanitary measures. As shown by him, it is not merely a "surmise" that yellow fever may be checked or annihilated, in a vessel, for instance, by a very practicable and safe elevation of temperature. Dr. Ferguson's[2] case of the Regalia, and Dr. A. N. Bell's of the Vixen and Mahones, are good evidence; and we share Dr. Harris's firm conviction that a high temperature, applied either by steam or by dry heating, will be found to afford the most effectual of all agencies, for the disinfection of ships, hospital wards, or other *foci* of pestilence.

In connection with the impurity of the air of sick rooms and hospitals, due attention is given by Dr. Parkes to the observations of Dundas Thomson, Brittan and Swayne, Schrœder, Eiselt, Chalvet, Pasteur, and Davaine upon the presence of organic forms in the atmosphere. At the St. Louis Hospital, Paris, Chalvet found the dust of a ward to contain from 36 to 46 per cent. of organic matter, principally epithelial cells; while pus cells have been detected in ophthalmic and other surgical wards by a number of observers. Davaine's experiments on the inoculation of splenic apoplexy of the sheep by transferring the bacteria living in the blood of the diseased animal, are certainly remarkable and suggestive.

The causation of phthisis to an extraordinary extent among the men of the Royal and Merchant Navies is in great part ascribed (p. 92) to faulty ventilation. Dr. Bryson asserts that the disease has appeared even to be propagated by contagion; and Dr. Parkes infers that pus cells were largely thrown off by coughing, and, floating through the air, were received into the lungs by other persons.

The chapters on ventilation in Dr. Parkes' book are very full, and well prepared. Comparing natural and artificial ventilation, he remarks, that circumstances differ so widely, that it is impossible to select one system in preference to all others. In temperate climates, in most cases, especially for dwelling houses, barracks and hospitals, with such powers of extraction as can be got by utilizing the sources of warming and lighting, natural ventilation is the best. Incessant movement of the air is a law of nature. We have only to allow the air in our cities and dwellings to take share in this constant change, and ventilation will go on without our aid. In the tropics, however, where the warm air often stagnates; and in temperate climates in certain buildings, where there are many small rooms, or where sudden assemblages of people take place, mechanical ventilation must be used.

[1] Report of Fourth National Quarantine and Sanitary Convention. Boston, 1860, pp. 219–238.

[2] Royal Med.-Chirurg. Trans., Vol. VIII.

Facts, figures, and excellent illustrations abound on the pages of Dr. Parkes' fifth, sixth, and seventh chapters, upon food; its nature, use in health and sickness, preparation, adulteration, and inspection. We resist the temptation to make large citations.

On the subject of "food for the sick" (p. 150), it is observed, that "fixed scales of diet for the sick must be used in hospitals for convenience; but the innumerable wants of the sick can never be compressed into three or four beds of Procrustes; and as the treatment by diet is better understood, the fixed diet tables will gradually become mere outlines, which will be filled up by orders for each special case." It may be allowed us to remark upon the obvious tendency of modern practice to improve the *quality* of nutriment in the diet of the sick. It may be believed, contrary to the prejudices and early teaching of the present generation, that the cases are very few indeed in which occasion exists for really diminishing the amount of nutritious material given to an invalid. It is the *state* of the food that needs modification, especially during illness; it must be liquid, or nearly so, but it may be concentrated; often in sickness it requires to be more so, and to be given, as all know, at much shorter intervals than in health. This expression may seem trite; but we are quite confident that "low diet" is, in inflammatory and febrile complaints, not unfrequently still abused by practitioners of routine. We have seen a hot skin and bounding, rapid pulse, in an individual of moderate systemic strength, give way to moisture and coolness upon the imbibition of two or three ounces of beef tea, without any other diaphoretic. And, while battling against "stimulism," as against any other exclusive system, we regard support by nourishment in sickness as a part of the duty of the physician not yet fully appreciated everywhere.

Dr. Parkes makes a sound practical remark in regard to the employment of concentrated articles of food by the soldier. From their smaller bulk, they relieve the sense of hunger more slowly than ordinary meals. The best way to obviate this is by making them into thick soups, if practicable; as, otherwise, the soldier will be tempted to eat two or three days' allowance at once.

On the topic of alcoholic beverages, our author judiciously avoids extreme statements and opinions. While he goes beyond the prevailing sanitary view of this country in admitting the frequent innocence if not utility of wine and beer, he insists and argues most forcibly against the use of ardent spirits in health, even in the emergencies of war, maritime life, or Arctic exploration. For the grog ration, on land or sea, nothing sound can be said, since it is inferior to warm coffee or tea as a preservative against cold and wet, while it heightens greatly the dangers of extreme heat; and against it are to be urged the diminution of the vital and active energy of the soldier, labourer and sailor, and the constant and imminent danger, under any checks whatever, of ruinous intemperance. One useful property of wine is mentioned, which has been often overlooked; that it is a potent antiscorbutic. Suggested by Lind and Gillespie, Dr. Parkes considers that this has been made certain by both French and English experience.

Chapter VIII. is upon soils, topographical reports, and choice of sites. Although short, it contains a great deal of information in a condensed form. Our readers may judge of Dr. Parkes' succinct mode of giving practical directions, by the following paragraphs, from a section upon "rules for choice of site." (p. 261.)

"If a site is to be chosen for a permanent station, see it at all times of the year and of the day; in the wet as well as in dry season, and at night as well as by day.

"*Height of Hills.*—Get the exact height of the hills from an engineer; or, failing this, determine it by the barometer. (See Meteorology.)

"*Geological Order, Direction, and Dip of Strata.*—Learn the position in the geological series, if possible, the direction of the dip of the strata, and the course of the fall of water.

"*Mechanical and Chemical Composition.*—Get as much information as possible in the way already pointed out; even a superficial examination is much better than nothing.

"*Analysis of Water.*—Analyze the water, and determine its quantity.

"*Subterranean Course of Water.*—Always choose a spot from which there is drainage, and into which there is no drainage.

"*Temperature, Dew-point, and Winds.*—Take as many temperature observations as possible, and dew-point determinations, and learn the direction of the winds, and, if possible, their force and temperature. Attend to all the rules already given on conformation, vegetation, and composition of soil, and dig holes of ten or sixteen feet in depth at various points. If possible, never take ground which has been much disturbed, and always avoid sites of old dwellings. A site under trees is good in hot countries, but brushwood must be avoided."

On habitations, in Chapter IX., a few general remarks are made, and the remainder of the chapter is devoted to barracks and hospitals. The largest opportunity for the supply of air is advocated. "I question," says Dr. Parkes, whether even 4,000 cubic feet per head per hour, now assigned by the best observers, will not be found to be far below the proper amount for the acute and febrile diseases." Miss Nightingale's views are essentially approved, as embodied in the following rules:—

"1. The sick should be distributed over as large an area as possible, and each sick man should be as far removed as possible from his neighbour.

"2. The sick should be placed in small detached and perfectly ventilated buildings, so that there is no great number of persons in one building, and there shall be no possibility of the polluted air of one ward passing into another." (pp. 294–5.)

The securing of perfect purity of air is, of course, partly a matter of construction, and partly of superintendence. With detached buildings, the size of an hospital is dependent merely on the facility of administration. When the hospital consists of a single building, the smallest hospitals are the best. This is no doubt sound doctrine.

Sewerage is very well considered in Dr. Parkes' tenth chapter. Diluted sewage is said not to be strongly fertilizing. It is not profitable to apply it to land unless it can be made to pass over the land by gravitation. The most hygienic proceeding is that adopted at Leicester. The sewage water is received into a tank and mixed with lime. The solid matter is so perfectly precipitated that the supernatant water has no taste, and may be allowed to pass into streams without injury. Unfortunately, the thick part left behind has scarcely any fertilizing power, as the ammonia is lost; and therefore this method is not financially successful. When sewage is allowed to flow over land, it is absorbed in large quantities, and so rapid is the deodorization that no nuisance is created. This has been abundantly proved on the Edinburgh meadows, and elsewhere.

The plan of allowing the solid and liquid excreta to pass into boxes or tanks, which are emptied daily, and applied to land without further treatment, is said to be profitable. In England and at Baden it has been successfully carried out in barracks. The "dry system" is coming into great use in India. It could only be extensively carried out in a country

with plenty of labour. One common method is to mix some deodorizing substance with the soil before its removal; dried surface earth (especially of clay or marl) has been strongly recommended for the purpose. In Paris and some other continental towns, a mixed system is in operation. The receptacle is pierced with holes, through which the urine passes and flows away in sewers; the solid soil is retained in the receptacle, and is periodically removed. For deodorization upon any similar plan, the carbolates and sulphites of lime and magnesia are considered to be the best materials.

Exercise and physical training occupy one chapter in Dr. Parkes' volume; and clothing, and weight of dress and accoutrements, and the modes of carrying the weights, two more. We pause only upon a few remarks (p. 379) as to the effects on health of the "regulation method of carrying the ammunition and kit."

"If the pack and pouch are much worn, the men suffer in health, and there is a loss of service to the State. Observant army surgeons have long been aware of the fact, and of late years the greater accuracy of diagnosis enables us to trace more perfectly the influence of faulty accoutrements. The older statistical returns of the army cannot be referred to as evidence, as the nomenclature employed (Cullins) was not accurate; the different kinds of heart diseases were not distinguished, and emphysema of the lungs was not included."

Dr. Maclean, Professor of Military Medicine in the Army Medical School, declares that a large amount of inefficiency, from diseases of the lungs, heart, and great vessels, is due to mischievous constriction of the chests of soldiers, at the time when there is demanded of them the maximum of exertion. Both heart and lung diseases are more common among young than old soldiers. Of 100 men discharged under two years' service, heart and lung disease together constituted in one year 47.85, and in the other 40.59. We call attention to these statements because they corroborate, in an important manner, like observations made in our own army hospitals, and recorded recently in this journal, in regard to the validity of which some doubt has been entertained even by army medical officers. Should no diagnosis of heart-disease among soldiers be admitted without palpable valvular murmurs or signs of enlargement, we are satisfied that gross injustice will often be done to individual health, with a corresponding sacrifice of economy to the service on whose behalf the error is committed.

After an elaborate description of the meteorological instruments used in the British army, and some remarks on meteorology, the topic of the atmospheric conditions of climate is very generally but philosophically treated by Dr. Parkes in a short chapter. A more directly practical one follows upon "the Prevention of some of the important and common Diseases in the Army." This is well worthy of careful study; but we can notice only a few points. Dr. Parkes states it as a "fact," about which he does not in his text suggest a question, that "the agent or poison which causes yellow fever is portable, can be carried and introduced among a community, and is increased in the bodies of those whom it attacks" (p. 428). With all deference to the high authority of the eminent author, our regard for the evidence, sustained by the unparalleled researches of Dr. La Roche, and the inquiries carefully discussed in our National Quarantine and Sanitary Conventions year after year, compels a most absolute denial of the latter part of his "fact," namely, that which in a note he calls the "strict contagion" of yellow fever. Accepting hopefully the qualifying sentence—"Still it appears, that if men leaving an infected place, or ship, pass into places well ventilated and in fair sanitary condition, they seldom carry the

disease"—we must urge that this could only represent the overwhelming preponderance of American evidence, if for the word "seldom" we were to substitute an emphatic *never*. A wave of contagionism has been passing over British medical opinion during the last few years; it is no more than candid, if it appear dogmatic, to say that sanitary science will gain more rapidly when it has spent its force.

A somewhat similar strain of remark is made by our author in regard to the mode, origin, and propagation of cholera, but with less positiveness of opinion. Without excluding other modes of transmission, that by the choleraic stools, especially when putrefying, their influence being conveyed by drinking water and by the air, is considered to be proved. A wider generalization will, hereafter, be understood to include this and all the other facts concerning the spreading of cholera by human intercourse; namely, the promotive influence of *all animal decomposition* in sustaining and developing the agency of the specific cause of cholera, whatever this may be.

Erysipelas also, it is stated unequivocally in the work before us (p. 438), is well known to be, in hospital wards, transmitted from patient to patient. Cannot all such supposed occurrences be at least equally well accounted for upon the simple view of local infection? We will leave this, although with strong convictions, as a question.

Passing over a judicious chapter of two pages on the "Disposal of the Dead," and an almost equally short and general one on the large subject (therefore designedly almost excluded) of "Individual Hygienic Management," we regret being obliged to mention merely, though with decided commendation, the last chapter of Dr. Parkes' first book, upon Statistics. It is a very well digested summary of the knowledge wanted upon that important and difficult topic by medical officers of the army, or by physicians and sanitarians anywhere.

Book II. is upon the Service of the Soldier, home and foreign. Like all the matter of the work, it is prepared elaborately, with German fulness strengthened by English method and condensation. Let us quote one summary (p. 594):—

"The chief causes of sickness and mortality in the English army have been, in order of fatality—

"1. Diseases arising from improper and insufficient food, viz., general feebleness and increased liability to malarious fevers, dysentery, bronchitis, &c., and actual production of scurvy and scorbutic dysentery.

"2. Malarious disease from unhealthy sites.

"3. Catarrhs, bronchitis, pleurisy, pneumonia, rheumatism, dysentery(?) produced by inclemencies of weather.

"4. Spotted typhus, kept up and spread (if not produced) by overcrowding and uncleanliness.

"5. Contagious dysentery, arising from foul camps and latrines.

"6. Typhoid and perhaps other fevers, produced by foul camps.

"7. Exhaustion and debility, produced by excessive fatigue—a very great predisposing cause of almost all other diseases.

"8. Cholera, in India especially, and in Turkey. 9. Yellow fever in the West India campaigns. 10. Plague in Egypt. 11. The exanthemata occasionally. 12. Ophthalmia. 13. Venereal diseases."

A *résumé* of the classification and administration of hospitals in war (pp. 596–601), at the close of the volume, has great interest at the present time. A practical precept or two may be noted. It is of great importance, in our author's mind, to keep continually sending patients from the division and general hospitals with the army to the hospitals in rear. This has a good effect upon the army itself, and the sick are often greatly benefited by

the removal. Such hospitals "in rear," it is now concluded, should never be the ordinary buildings of the country adapted as hospitals. This adaptation is expensive, and probably always imperfect. Churches should never be taken, as they are not only cold but often damp, and there are often exhalations from vaults. French, Austrian, and American experience is stated to be in favour of having the hospitals in rear made of tents or wooden huts; the huts are thought to be perhaps the best, at least if the winter be cold. Reference upon these and other points is repeatedly made to the experience of our army during the present war, especially as exhibited in Surgeon-General Hammond's work on hygiene.

We take leave of Dr. Parkes' treatise with the repetition of the opinion that it is a very substantial, well-written, and valuable book, likely to have a permanent place as an authority.

Professor Mapother's course of twelve lectures upon Public Health was delivered, free to the public, at the Royal College of Surgeons, in Dublin, last year. They are practically instructive and interesting. From his first lecture we may quote the following instances of the benefit of sanitary reform:—

"In Liverpool, in 1842, one-third of the labouring population lived in cellars about twelve feet square, sometimes less than six feet high, often without windows, and only lighted and ventilated by a door frequently below the level of the street. Its death rate was 38 in 1846, but now, owing to the philanthropic labours of Dr. Duncan in carrying out improved sewerage, closing of cellars, preventing over-crowding, especially in the low lodging-houses, and separating contagious cases, it has been reduced to 24, or less than two-thirds its former rate, and thus it may be estimated from the population of that city that 4000 lives have been annually saved.

When the Macclesfield Board of Health began its labours, the death rate there was 33; for the last five years it has been but 26, so that 1015 lives have been saved. 28,420 less cases of sickness have occurred."

There appears to be need of popular teaching of preventive medicine in Dublin; since it is stated that of 100 children of the labouring classes born there, but 34 live to be 20, 20 to be 40, and only 14 to be 50; without any deficiency whatever in the skill or zeal of the medical attendants upon the poor. Stunted proportions and scrofulous aspect also show unfavourable sanitary conditions among those who survive in the more crowded and otherwise insalubrious parts of the city. It is agreeable to learn from Dr. Mapother that improvements have already been instituted which will do much to lessen these terrible evils.

In the second lecture of this course, on Air and its Impurities, along with a great deal of very useful information, the *therapeutical* value of pure air is asserted, on the authority of the following language of Mr. Paget:—

"Of all the remedies I have used, or seen in use, I can find but one thing that I can call remedial for the disease pyæmia, and that is a profuse supply of fresh air. In the three most remarkable recoveries I have seen, the patients might be said to have lain day and night in the wind—wind blowing all about their rooms."

Possibly this *vis medicatrix* of a pure atmosphere may have been too much overlooked. We may be too much afraid of open windows. We have known a patient with typhoid pneumonia, urging and insisting upon the admission of all the air possible from windows and doors, when the temperature of it was but a few degrees above zero Fahr., and have found benefit from acceding to this demand of nature.

An interesting reference is made in Dr. Mapother's third lecture, to the

first suggestion by Dr. Benjamin Franklin of an aperture in the flue near the ceiling for the ventilation of a room. This was proposed by him in 1744.

Heat as a disinfectant does not receive from this author, any more than from Dr. Parkes, its full share of appreciation. He questions whether it may not act merely by increasing aerial circulation, although he adds that plague is arrested by a temperature of 120°. Among disinfecting agents, Dr. Mapother regards nitrous acid as especially reliable, particularly to destroy those organic emanations which are the sources of typhus.

In a lecture on Water and its Impurities (Lecture IV.), the same author furnishes a striking illustrative contrast, in the maximum of purity of the Loka, in Sweden, which, flowing over granite, contains but one-twentieth of a grain of impurity per gallon, or of Loch Katrine, now supplied to Glasgow, holding but two and one-third; and, on the other hand, the water of a pump in Liverpool having 417 grains of solids per gallon, or that of Park Crescent, London, containing, as Dundas Thomson shows, 43 grains per gallon of organic matter, chiefly from sewage. The Brussels Sanitary Congress fixed the maximum quantity of solid matter which potable water might contain at 49½ grains per gallon, of which not more than a grain should be organic. Dr. Mapother does not admit, however, that this standard should be absolute, since some of the best waters have nearly double the amount of organic matter thus assigned.

Additional evidence is furnished, from facts in Ireland, in support of the now generally received doctrine, that goitre is owing to an excess in the drinking water of salts, of lime, and of magnesia. In Gorruckpoore the soil upon which many villages are built is so calcareous that some specimens contain 25 per cent. of carbonate of lime, and 10 per cent. of the adults are affected with goitre, and about as many of the children are cretins.

In his lectures upon Food, Dr. Mapother advocates killing animals for food in modes which would allow the retention of the blood, as thus a great deal of nutritive matter is saved. The following are mentioned:—

"1. Compressing the lungs with air, patented by Dr. Carson, or with water, as practised at my suggestion. The fluid may be forced into the cavity outside the lung by a sharp-pointed tube thrust in between the fifth and sixth ribs, and to which is attached a large elastic bag. 2. By blowing air into the jugular vein, the way horses are often destroyed on the hunting field. 3. By thrusting a knife into that part of the brain known as the fourth ventricle; or, 4, as practised in the abattoirs of Paris, dividing the spinal marrow in the neck. The equestrian people of the American pampas kill their oxen in a way which does not extract the blood, and upon their flesh, usually dried in the sun, and constituting their sole diet, they attain the acme of muscular vigour."

It is correctly observed, that climate may have much to do with the suitableness of such methods of preparing meat; since putrefaction of course goes on more rapidly, with heat, in the moist condition; blood will spoil sooner than flesh. Beef is now taken from South America and Australia to Great Britain, and Dr. Mapother thinks it may be a boon to the poor. Analysis shows for Montevideo beef, as compared with average corned beef, more than than eight times as much nitrogenized substance, although only one-seventh as much fat.

The Lectures, in the course we are now considering, upon Clothing, Bathing, and Physical and Mental Exercise, are interesting and practical. All hygienists must especially approve the recipe for rearing healthy children, quoted from John Hunter: "Plenty of milk, plenty of sleep, and plenty of flannel."

In his ninth lecture, Dr. Mapother treats very well of Sanitary Engineering and Architecture, Hospitals, &c. To his view, the Herbert Hospital, near Woolwich, is the most scientifically constructed edifice of the kind in Europe. It consists of seven pavilions, the ends of which all project into free air, and which are separated from each other by twice their height in distance. There are but two floors to each pavilion. The baths and water-closets are in the free ends, and the latter are thus thoroughly aired. Each ward is 26½ feet wide and 14 feet high, and contains 30 beds; the cubic space for each being about 1300 feet. Windows are abundant, there being one for two beds, arranged along opposite walls; and as the axis of the wards is a little to the east of north, each side will be enlivened by the sun during some part of the day.

As an example of the influence of imperfect *house-drainage* on the mortality of cities, Dr. Mapother mentions Stockholm. Although situated upon small islands, so that abundant ventilation and cleansing would seem to be secured, it has a higher death-rate than any other European city. This is accounted for by the deficiency of the supply of water, not a single house, except the hotels, having a water-closet.

Dr. Mapother expresses a rather more hopeful view of the financial side of the sewage problem than that we have cited from Dr. Parkes. Baron Liebig has asserted that the manufacturers of artificial manures are inimical to the utilization of sewage. A wordy warfare has hence arisen, and the subject is to be specially discussed by the Public Health section of the Social Science Association at its next Congress.

Climatology, especially in reference to England and Ireland, is considered in the tenth lecture of this course, and the Prevention of Zymotic and Constitutional Diseases in the eleventh; Vital Statistics in the twelfth and last. Dr. Mapother adopts without hesitation the doctrine that "typhoid fever is about the most preventable of diseases;" that "there is much greater risk of contagion from the decomposition of the poison in faulty sewers than from the atmosphere about patients, and its progress is much more virulent when introduced by water drank than by air inspired." It is, however, typhus that has always been Ireland's greatest enemy, it being still five times as frequent in Dublin as in London in proportion to the population.

The influence of impure air in promoting consumption has, probably, heretofore been underrated. Dr. Mapother, supported by Dr. McCormac, Dr. Aitken, and others, urges it strongly as one of the modes of morbid causation over which public sanitary regulations should exert control.

Not having space to remark upon the Lecture on Statistics in Dr. Mapother's book, we may observe that such a course, delivered before a public audience in a great city, and afterwards published in an inexpensive form, must do a great deal of good, not only by its suggestions for individual management, but by preparing the popular mind for measures of sanitary reform, whose proposal often meets, among the ignorant, with apathy or even with opposition.

Stewart Clark's work on "The Hygiene of the Army in India" might well have an analytical review to itself. It is interesting and worthy of study for the amount of practical information it conveys in a clear and forcible style and with abundant illustrations.

Air, water, food, conservancy, drainage, supervision, and the construction of barracks and prisons, are successively considered with direct reference to the condition of the British troops in India.

This author inclines strongly to the view that impurity of the *air* is

more important, in a sanitary aspect, than foulness of the water; the latter being certainly heightened, to a great degree, by absorption of gases from the atmosphere. Angus Smith estimated the animal matter thrown out in the form of a putrescible albuminous substance, by respiration alone, as three parts in every one thousand of respired air. Mr. Clark recalls the virulent action of inoculated matter in dissecting wounds, to show what destructive properties may attend even the early stage of decomposition of emanations from the human body. Climate and uncleanly habits intensify, in India, for example, such idiomiasmata.

The atmospheric conditions and changes of India are totally unlike anything experienced in our quarter of the world. S. Clark's account of them is full and interesting. There is, during the dry weather, which makes about seven months of the year, a diurnal variation, quite regular. After eight or nine hours of dead calm, from six or seven o'clock P. M. to three or four A. M., motion begins slightly in the air, with puffs from the W. and N.W. By five or half past five A. M., these have grown into a steady light breeze from the W.N.W. This gains its maximum strength about two P. M., and then gradually decreases till six or seven P. M. The dead calm succeeds, in which, as Mr. Clark describes it, "in addition to coolies to pull the punkah (fan) one feels that a greater luxury still would be two or three to do the work of breathing." It is in this period that foul-air poisoning proceeds most silently and surely. Besides, the relaxation of the oppressive calm and heat of the night predisposes the body to be unfavourably acted upon by the lowering of temperature and draught of air that follow. Thus night, or early morning, is the time of greatest depression in fevers (though this is not peculiar to India), and at the same period the brief incubation of cholera may be observed and should be vigilantly met by appropriate treatment.

Clark's statements are very positive and important in regard to the circumstances which most promote cholera in India. It occurs in groups of men,

"Almost always after the affected have been unduly exposed to foul air from bad ventilation, overcrowding in their dwelling-places, or the massing together of large numbers of human beings, which, even in the open air, will contaminate the atmosphere for some distance, as at large fairs and in large standing camps, where great numbers of people are congregated. After the Hurdwar and other large fairs in India, cholera almost always appears in the villages on the lines of roads leading from them, but the cases are generally *confined to people who have been at these fairs.*" (p. 13.)

What an argument against any theory of contagion, however modified, is presented in the words we have italicised above! But Mr. Clark furnishes much more evidence of a similar bearing; some of which mitigates against the idea of almost exclusive *water-transmission* of cholera, so eloquently supported by Dr. Snow. Thus, while the Hooghly River is always intensely filthy, from the sewage of Calcutta and a number of villages on its banks, and from thousands of dead bodies and carcasses of dead animals floating in it; and although the crews of all the ships arriving at Calcutta are supplied with it, not always filtered at all and never perfectly; yet Mr. Clark gives the following statements (p. 80):—

"I was long connected with ships trading to Calcutta, and was intimately acquainted with the captains and officers in the same service, and never once heard of the cholera breaking out on board in an epidemic form after the ship was fairly at sea. I made ten voyages to Calcutta, and had medical charge of four different detachments of European invalids from that place to England, and never saw any disease among the troops, crew, or passengers which I could at-

tribute to bad water. It is to be observed (and I think deserves some attention) that I always belonged to large, well-ventilated ships, where every attention was paid to cleanliness and comfort, but the water was from the river, as with every other ship."

Instances to the same effect, as our author remarks, might be, in addition to several which he narrates, enumerated to almost any extent. He confirms with emphasis the conclusion of the Commissioners who reported upon the epidemic cholera of 1861 in Northern India, that "mere contamination of the drinking water may cause disease, but will not cause cholera."

Ventilation is, of course, more difficult in the climate of India than even in the summer of temperate climates; the temperature of the external and internal air of buildings being so nearly the same; most of all, in the hours of stagnant calm. In the army tents of India, with twenty-five men in each (a cubic space per man of not more than 125 feet), it is said by Mr. Clark to be even worse than in barracks; but artificial means of ventilation are indispensable in both. Punkahs will set the air in motion, but they do not expel foul air from the interior, nor reduce its temperature. "It is the *plenum* method alone that can afford thorough ventilation in India.

Mr. Clark gives descriptions, in full detail, with wood-cuts, of apparatus adapted to barracks and to tents. The "thermantidote" is a rotary fan or blower, by which air can be impelled through canvas tubes, and distributed at pleasure. A large apparatus of a similar sort, with diffusion pipes in the side walls, or diffusion cases in the centre of the barracks, will change the air most perfectly; refrigeration may be attained at the same time by "kus-tatties" or evaporating screens of sweet smelling grass. Egress openings for vitiated air, it is advised, should be in the roof, by open ridges; from which birds are excluded by wire-nettings. Strong draughts are sometimes urged as an objection to the "plenum" method; but Mr. Clark does not admit its application. "The perfection of ventilation consists in the free supply of air, so completely attuned to, and in harmony with, the frame on which it acts, that its operation is not perceived." In St. George's Hall, Liverpool, as well as in several other public buildings in Europe and in this country, this plan has been used upon a large scale with excellent success. Portable blowers for movable tents are described by Mr. Clark, as proposed by him for India.

One of the greatest evils in India is its deficient water supply; there is too little water afforded for drinking, cooking, and ablution, and its sources are too near the surface, and thus impure. Deeper boring, and the most careful filtration, are recommended; and, particularly in regard to the latter, explicit instructions are given in the book under notice. It is by no means a depreciation of the importance of contamination of water that Mr. Clark intends by the remarks we have already quoted; but merely an expression of his conviction of the primary necessity of a pure atmosphere.

As to diet, the prevailing error among Europeans, and especially the English, in India, has been excess in quantity. Too many meals and too much meat, as well as spirits, have been the rule; now, happily, somewhat amended. Sir Hugh Rose has reduced the spirit ration in the army in India to one half; it would be better, no doubt, to abolish it altogether. The regulation allowance[1] was six ounces of rum every day, besides what the soldier might surreptitiously obtain at the bazaar. Let us here leave Stewart Clark's book, and listen to Miss Florence Nightingale upon this and allied topics.[2]

[1] Report of Social Science Association, 1863, p. 283.
[2] Ibid.; paper entitled "How People may Live and Die in India."

"So much for intemperance; but not to this, and its kindred vice alone, or to this mainly, is to be laid the soldier's mortality in India, as has been falsely supposed. The diseases from which the soldier suffers there are miasmatic; now, intemperance never produced miasmatic diseases yet. They are foul air diseases and foul water diseases—fevers, dysenteries, and so on. Intemperance may cause liver disease, and put the men into a state of health which prevents them from resisting miasmatic causes. What are these causes? We have not far to look. The Briton leaves his national civilization behind him, and brings his personal vices with him. At home there have been great improvements everywhere in agriculture and in town drainage, and in providing plentiful and pure water supplies. There is nothing of the kind in India."

Well may the same noble reformer assert the truth of the conclusion of the Royal Commission on the sanitary state of the army of India, that "unless the health of the British army in India could be improved, and the enormous death rate reduced, it would be impossible ever to hold India with a British army." The question is no less than how to create a Public Health Department for India—how to bring European civilization into that country; not only for its own sake, but for the very existence of European colonists. That such is possible, and promises, even, to be done, we are glad to be assured by the same authorities, who insist, emphatically, that there is not a shadow of proof that India was created to be the grave of the British race. Should their hopes, even long hence, be fulfilled, it may prove one of the grandest triumphs, not only of applied sanitary science, but of human progress and development. H. H.

ART. XV.—1. *History and Statistics of Ovariotomy, and the Circumstances under which the Operation may be regarded as safe and expedient; being a Dissertation to which the prize of the Massachusetts Medical Society was awarded*, May, 1856. By GEORGE H. LYMAN, M. D. pp. 146. Boston: 1856.

2. *Chapters on Diseases of the Ovaries, translated, by permission, from* KIWISCH'S *Clinical Lectures on the Special Pathology and Treatment of the Diseases of Women; with Notes and an Appendix on the Operation of Ovariotomy.* By JOHN CLAY, Member of the Royal College of Surgeons, Eng., etc. etc. pp. 254. London: John Churchill, 1860.

3. *On Ovarian Dropsy; its Nature, Diagnosis, and Treatment. The result of thirty years' experience.* By I. BAKER BROWN, F.R.C.S., Senior Surgeon to the London Surgical Home for Diseases of Women, &c. &c. pp. 283. London: John W. Davies, 1862.

4. *The Transactions of the Academy of Medicine; containing Ovariotomy.* By E. R. PEASLEE, M. D., LL.D. New York: Bailliere Brothers, 1865.

FEW operations in surgery have struggled up through more determined and persistent opposition to an honourable recognition than ovariotomy. It is but little more than half a century since the first systematic operation was performed, and during that period it has several times been discarded and almost forgotten. Its opponents have been untiring in their opposition, and unsparing in their criticism. It has been termed "belly ripping"